

CLAIMS

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What is claimed is:

1. A composition for the chemical mechanical planarization of tungsten comprising:

- 10 a) An abrasive selected from the group consisting of alumina, spinel, ceria, zirconia and mixtures thereof; and,
- b) An abrasive slurry comprising at least one abrasive selected from the group consisting of silica, alumina, zirconia, ceria and mixtures thereof as a slurry in deionized water; and,
- c) Periodic acid; and,
- d) Ammonium nitrate; and,
- e) A mineral acid in such quantity as to prevent the precipitation of salts of iodic acid.

2. A composition as in claim 1 wherein said abrasive is alumina.

3. A composition as in claim 2 wherein said alumina is form of alumina other than alpha alumina.

4. A composition as in claim 3 wherein said alumina is gamma alumina.

5. A composition as in claim 2 wherein said alumina is present in said composition in an amount
25 from approximately 2% to approximately 4% by weight.

6. A composition as in claim 1 wherein said abrasive slurry is a silica slurry.

7. A composition as in claim 6 wherein said silica slurry is from approximately 0.1% to
30 approximately 0.5% silicon dioxide.

8. A composition as in claim 1 wherein said periodic acid is present in said composition in an amount from approximately 2% to approximately 4% by weight.

9. A composition as in claim 1 wherein said ammonium nitrate is present in said composition in an amount from approximately 0.1% to approximately 2% by weight.
- 5 10. A composition as in claim 1 wherein said mineral acid is nitric acid.
11. A composition as in claim 10 wherein said nitric acid is present in said composition in an amount of 0.2% by weight.
- 10 12. A composition as in claim 1 wherein said mineral acid is present in said composition in an amount so as to maintain the pH of said composition in the range from approximately 3 to approximately 4.5.
13. A composition as in claim 12 wherein said mineral acid is present in said composition in an amount so as to maintain the pH of said composition in the range from approximately 3.8 to approximately 4.2.

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